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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,394	03/09/2004	Takuya Tsukagoshi	890050.468	1892

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EXAMINER

LAVARIAS, ARNEL C

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 04/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/796,394

Applicant(s)

TSUKAGOSHI, TAKUYA

Examiner

Arnel C. Lavarias

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The amendments to the specification and abstract in the submission dated 2/1/06 are acknowledged and accepted. In view of these amendments, the objections to the specification in Sections 4-5 of the Office Action dated 11/1/05 are respectfully withdrawn.
2. The amendments to Claim 1 in the submission dated 2/1/06 are acknowledged and accepted. In view of these amendments, the objections to the claims in Section 6 of the Office Action dated 11/1/05 are respectfully withdrawn.
3. The cancellation of Claims 4-6 in the submission dated 2/1/06 is acknowledged and accepted.

Response to Arguments

4. The Applicant argues that, with respect to newly amended Claim 1, as well as Claims 2-6 which depend on Claim 1, both Chou et al. and Waldman et al. fail to teach or reasonably suggest a pinhole disposed at a confocal point of the Fourier transform lens and the reverse Fourier transform lens, the pinhole being disposed either between the holographic recording medium and the Fourier transform lens or between the holographic recording medium and the reverse Fourier transform lens. After reviewing both the Chou et al. and Waldman et al references, the Examiner agrees, and respectfully withdraws the rejections in Sections 8-12 of the Office Action dated 11/1/05.

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5. Claims 1-3 are now rejected as follows.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chou et al.

(W. Chou, M. A. Neifeld, 'Interleaving and error correction in volume holographic memory systems', Appl. Opt., vol. 37, no. 29, October 10, 1998, pp. 6951-6968.), of record, in view of Curtis et al. (U.S. Patent No. 6163391) and Bernal et al. (M. P. Bernal, G. W. Burr, H. Coufal, M. Quintanilla, 'Noise in high-areal-density holographic data storage systems', Opt. Soc. America, Washington, D.C., USA, May 1998, pp. 21-22.), of record.

Chou et al. discloses a holographic recording and reproducing apparatus (See for example Figure 1; Section 2A) for recording data as phase information of light in a holographic recording medium (See 'memory' in Figure 1) by projecting a signal beam and a reference beam thereonto, the holographic recording and reproducing apparatus comprising at least a spatial light modulator (See 'SLM' in Figure 1), a Fourier transform lens (See 'lens 1' in Figure 1), a reverse Fourier transform lens (See 'lens 2' in Figure 1), and a CCD image sensor (See 'CCD' in Figure 1), the holographic recording medium being disposed between the Fourier transform lens and the reverse Fourier transform lens,

and the focal length of the Fourier transform lens is set to be different (e.g. longer) than that of the reverse Fourier transform lens (See Sections 2C, 2D). Chou et al. lacks a pinhole disposed at a confocal point of the Fourier transform lens and the reverse Fourier transform lens, such that the pinhole is disposed either between the holographic recording medium and the Fourier transform lens or between the holographic recording medium and the reverse Fourier transform lens. However, Curtis et al. teaches a conventional method and apparatus for holographic data storage (See for example Figures 1, 15), wherein the holographic recording medium (See for example 30 in Figure 1; 520 in Figure 15) may be located away from the focal point of the incident Fourier transform lens (See for example Figures 6-7, 10-11, 13-14). This repositioning of the focal point of the Fourier transform lens may be performed by positioning the recording medium away from the focal point of the Fourier transform lens (See for example Figure 13) or by utilizing additional powered lenses (See for example 390/395 in Figure 10; 405 in Figure 11) in conjunction with the Fourier transform lens to adjust the convergence or divergence of the incident light beam (See col. 10, line 1-col. 12, line 29). In addition, Bernal et al. teaches a digital holographic storage system utilizing a 4F lens design (See Figure 1), wherein an aperture is placed at the Fourier plane of the 4F system (it is noted that this Fourier plane occurs at the confocal point of the Fourier (See L_1 in Figure 1) and reverse Fourier (See L_2 in Figure 1) lenses at point 'D'). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the apparatus of Chou et al. further comprise a pinhole disposed at a confocal point of the Fourier transform lens and the reverse Fourier transform lens, such that the pinhole is

disposed either between the holographic recording medium and the Fourier transform lens or between the holographic recording medium and the reverse Fourier transform lens, as taught by Curtis et al. and Bernal et al., for the purpose of 1) minimizing the sensitivity of the holographic recording medium to shrinkage due to curing or temperature changes and 2) minimizing crosstalk noise.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chou et al. in view of Curtis et al. and Bernal et al.

Chou et al. in view of Curtis et al. and Bernal et al. discloses the invention as set forth above, except for the focal length of the reverse Fourier transform lens being set longer than that of the Fourier transform lens. However, since Chou et al. already discloses that the focal length of the Fourier transform lens may be longer than or equal to that of the reverse Fourier transform lens, one of ordinary skill would have also been likely to design a similar holographic recording and reproducing apparatus utilizing an asymmetrical 4F lens design, wherein the focal length of the Fourier transform lens is shorter than that of the reverse Fourier transform lens (i.e. the focal length of the reverse Fourier transform lens is longer than that of the Fourier transform lens), particularly when there is a mismatch in pixel sizes between the SLM and the CCD. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the focal length of the reverse Fourier transform lens be set longer than that of the Fourier transform lens in the holographic recording and reproducing apparatus of Chou et al. in view of Curtis et al. and Bernal et al., for the purpose of optimizing the light throughput of the optical system, while reducing unwanted errors due to optical noise.

9. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Waldman et al. (U.S. Patent Application Publication US 2005/0134948 A1), of record, in view of Bernal et al.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Waldman et al. discloses a holographic recording and reproducing apparatus (See for example Figures 1, 4) for recording data as phase information of light in a holographic recording medium (See 114 in Figure 1; 414 in Figure 4) by projecting a signal beam and a reference beam thereonto, the holographic recording and reproducing apparatus comprising at least a spatial light modulator (See 104 in Figure 1; 404 in Figure 4), a Fourier transform lens (See 108 in Figure 1; lens between element 404 and 412 in Figure 4), a reverse Fourier transform lens (See 116 in Figure 1; lens between 414 and 424 in Figure 4), and a CCD image sensor (See 124 in Figure 1; 424 in Figure 4), the holographic recording medium being disposed between the Fourier transform lens and the reverse Fourier transform lens, and the focal length of the Fourier transform and focal length of the reverse Fourier transform lens being different from each other (See ' f_1 ', ' f_2 ' in Figures 1, 4). Waldman et al. additionally discloses the confocal point of the Fourier transform lens and the reverse Fourier transform lens being disposed between the Fourier transform lens and the holographic recording medium (See 412 in Figure 4; Paragraph 0045). Waldman et al. lacks a pinhole disposed at the confocal point of the Fourier transform lens and the reverse Fourier transform lens. However, Bernal et al. teaches a

digital holographic storage system utilizing a 4F lens design (See Figure 1), wherein an aperture is placed at the Fourier plane of the 4F system (it is noted that this Fourier plane occurs at the confocal point of the Fourier (See L_1 in Figure 1) and reverse Fourier (See L_2 in Figure 1) lenses at point 'D'). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the apparatus of Waldman et al. further comprise a pinhole disposed at the confocal point of the Fourier transform lens and the reverse Fourier transform lens, as taught by Bernal et al., for the purpose of minimizing crosstalk noise.

10. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Waldman et al. in view of Bernal et al.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Waldman et al. in view of Bernal et al. discloses the invention as set forth above, except for either the focal length of the reverse Fourier transform lens being set longer than that of the Fourier transform lens or the focal length of the Fourier transform lens being set longer than that of the reverse Fourier transform lens. However, since Waldman et al. already discloses that the focal length of the Fourier transform lens may be made different to that of the reverse Fourier transform lens, one of ordinary skill would have been likely to design a similar holographic recording and reproducing apparatus utilizing an asymmetrical 4F lens design, wherein the focal length of the Fourier transform lens is shorter/longer than that of the reverse Fourier transform lens

(i.e. the focal length of the reverse Fourier transform lens is longer/shorter than that of the Fourier transform lens), particularly when there is a mismatch in pixel sizes between the SLM and the CCD. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have either the focal length of the reverse Fourier transform lens be set longer than that of the Fourier transform lens or the focal length of the Fourier transform lens be set longer than that of the reverse Fourier transform lens in the holographic recording and reproducing apparatus of Waldman et al. in view of Bernal et al., for the purpose of optimizing the light throughput of the optical system, while reducing unwanted errors due to optical noise.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

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advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-2315. The examiner can normally be reached on M-F 9:30 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Arnel C. Lavarias
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Group Art Unit 2872
4/4/06